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(54) Dishwashing machine with height-adjustable rack

(57) Dishwashing machine with a rack supported on each side in the washing vessel of said machine and selectively displaceable from an upper position to a lower position, and vice-versa, by means of a front pin and a rear pin that are slidable along two slots in a side-by-side arrangement, respectively. Said slots (23, 24) are asymmetrical and in the shape of a V turned in such a way as to have their vertices facing each other. The lower legs of said slots comprise respective seats (23i, 24i) adapted to accommodate their respective sliding pins (13, 14) so as to support the rack (10) in the lower position thereof, whereas the upper legs of said slots comprise respective seats (25, 24s) adapted to accommodate the respective sliding pins (13, 14) so as to support the rack (10) in the upper position thereof.

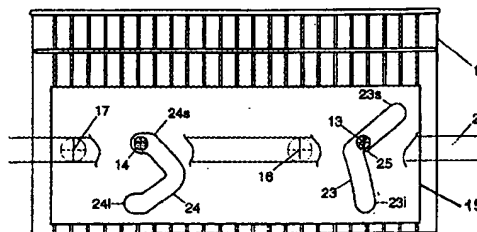


FIG. 4

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Description

[0001] The present invention refers to a dishwashing machine in the washing vessel of which there is provided at least a height-adjustable rack adapted to accommodate and support the washload items.

[0002] Racks are already known in the art which are mounted in the washing vessel of a dishwashing machine with the aid of means adapted to support the same racks in a selectively height-adjustable manner, preferably between a lower position and an upper position, as well as in a horizontally slidable manner on side runners or similar guiding means.

[0003] A rack of the above cited kind is known for instance from the disclosure in DE-A-4 227 585, in which on each one of the opposite sides of the rack there are provided a pair of appropriately shaped slots adapted to slidably engage associated pins that are firmly joined to a support guide, which in turn is mounted in a horizontally slidable manner inside the washing vessel of the dishwashing machine. In particular, the slots are substantially similar to each other, provided in a side-by-side arrangement and substantially in the shape of a C whose ends represent respective limit stops for said pins, so as to enable the user to selectively adjust the height of the rack by correspondingly displacing it between a lower position and an upper position thereof.

[0004] Such a displacement can be carried out by a manual operation that usually turns out to be relatively complicated, since it requires the user to substantially pull out the rack from the washing vessel before lifting it by holding it with the hands on both sides thereof.

[0005] It would on the contrary be desirable, and it actually is a main purpose of the present invention, to provide a dishwashing machine having at least one of such height-adjustable racks, which is capable of being displaced, ie. adjusted in a more simple and convenient manner between a lower and an upper position thereof by carrying out a particularly easy and smooth manual operation that can actually be performed without any problem at all also using a single hand.

[0006] A further purpose of the present invention is to provide a dishwashing machine with a rack of the above cited kind which is also capable of being adjusted in its height without any need arising for it to be pulled out from the washing vessel of the machine.

[0007] According to the present invention, these aims are reached in a dishwashing machine having at least a height-adjustable rack embodying such features as substantially recited in the appended claims.

[0008] Anyway, the features and advantages of the invention will be more readily understood from the description that is given below by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a schematical side view of the rack of a

dishwashing machine according to the present invention, as adjusted in its upper position;

- Figure 2 is a schematical side view of the rack of the dishwashing machine illustrated in Figure 1, as adjusted in an intermediate position during its displacement from said lower position to said upper position;

- Figure 3 is a schematical side view of the rack of the dishwashing machine illustrated in the Figures 1 and 2, as adjusted in its lower position; and

- Figure 4 is a perspective side view of the main feature of the present invention.

[0009] When particularly considering the Figures 1 to 3, the rack 10 can be noticed to be made, in a generally known manner, of plastic-coated metal wire and is adapted to be supported in the washing vessel of a dishwashing machine (not shown) so as to be capable of being pulled out by sliding on runners 20 attached on to the inner surfaces of the side walls of the washing vessel.

[0010] According to the present invention, on each side of the rack 10 there is secured, for instance by means of hooks, claws or similar clinching means 11 (Figure 4), a support 12 in the form of a vertical shaped plate. Each support 12 is provided with two pins, ie. a front pin 13 and a rear pin 14, which are substantially aligned horizontally and protrude towards the walls of the washing vessel.

[0011] The pins 13 and 14 of each support 12 are inserted in and cooperate with respective slots 13 (front slot) and 24 (rear slot) provided in a second appropriately shaped vertical plate 15 which therefore happens to be arranged between the side wall of the washing vessel and the side wall of the rack.

[0012] The slots 23 and 24 are substantially V-shaped and turned so as to have their vertices facing each other, and are asymmetrical. Preferably, the lower end portions 23i and 24i are substantially aligned horizontally, whereas the end portion 235 of the front slot 23 is arranged at a higher level than the end portion 24s of the rear slot 24. Furthermore, the vertex of the front slot 23 is arranged at substantially the same level as the upper end portion 24s of the rear slot 24.

[0013] The lower end portions 23i and 24i of the slots 23 and 24 form respective seats to accommodate the pins 13 and 14 when the rack 10 is in its lower position. When the rack 10 is on the contrary in its upper position, the pin 13 comes to be housed in a seat 25 provided near the vertex of the respective slot 23, whereas the pin 14 is housed in a seat formed by the upper end portion 24s of the respective slot 24.

[0014] Each plate 15 is further provided with two wheels 16, 17 adapted to run along the corresponding runner 20 which is secured to the respective side wall of

the washing vessel in the usual manner.

[0015] Therefore, the crockery supporting rack 10 is capable of being practically inserted into and pulled out of the washing vessel in a practically traditional manner thanks to the wheels 16, 17 rolling along the side runners attached inside the washing vessel.

[0016] The crockery supporting rack 10 can further be displaced from an upper position (Figure 1) to a lower position (Figure 3), and vice-versa, thanks to the afore described support means which at the same time perform also as means for the height adjustment of the rack, ie. the position thereof.

[0017] All it takes for displacing the rack from the lower position to the upper position thereof is a combined rotary and translatory movement to be performed by the user.

[0018] In fact:

- the rack is initially raised frontally by causing it to turn about the rear pins 14, while the front pins 13 move up along the lower leg until they climb over the vertices of the respective slots 23;
- the rack is then pulled forward so as to cause the front pins 13 to slide along the respective upper legs of the slots 23, while the rear pins are enabled to slide along the lower legs of their respective slots 24 until they climb over the vertices thereof, with the result that the rack 10 moves forward and tilts upwards with respect to the side plates 15;
- finally, the rack is released so as it is able to slide backwards, thereby causing the front pins 13 to slide downwards along the upper legs of their slots 23 until they stop in the corresponding seats 25, whereas the rear pins 14 slide back into their seats at the upper end portions of the slots 24.

[0019] Since the seats of the front pins 13 in correspondence of the vertices of the slots 23 are substantially at the same height as the upper end portions of the slots 24 forming the seats for the pins 14, the rack 10 is actually supported in a horizontal condition also when adjusted in its upper position.

[0020] For the rack 10 to be brought back to its lower position, all it takes is to lift it again on the front and pull it forward, so as to release the front pins 13 and the rear pins 14 from their respective seats, while letting the pins 13 slide upwards in the slots 23, while the pins 14 slide downwards in the slots 24 until they climb over the vertex thereof. The rack 10 is then released so as to also enable the pins 13 to climb over the vertices of their respective slots 23, until the pins 13 and 14 eventually reach their position and stop in their respective seats at the lower end portions 23i and 24i of the slots 23 and 24. At this point the rack is arranged in a horizontal condition in its lower position.

[0021] It clearly emerges from the above description

that both operations required to lift and to lower the rack 10 can be carried out by the user in a simple and convenient manner also with a single hand, by grasping the rack frontally. As a result, no need arises for the same rack to be preliminarily pulled out of the washing vessel, as this generally proves necessary in conjunction with prior-art solutions.

Claims

1. Dishwashing machine with at least a rack adapted to be supported in the washing vessel of the machine, in correspondence of each one of two mutually opposing sides thereof, by means of respective adjustment means that enable it to be selectively displaced from an upper position into a lower position thereof, and vice-versa, each one of said adjustment means comprising a front pin and a rear pin adapted to respectively slide along a first and a second slot provided in a substantially side-by-side arrangement, characterized in that said slots (23, 24) are substantially asymmetrical and in the shape of a V, so turned as to have their vertices facing each other, wherein the lower legs of said slots comprise respective seats (23i, 24i) adapted to accommodate their respective sliding pins (13, 14) so as to support the rack (10) in said lower position thereof, while the upper legs of the slots comprise respective seats (25, 24s) adapted to accommodate their respective sliding pins (13, 14) so as to support the rack (10) in said upper position thereof, the rack being displaceable between said upper and lower positions thereof by a combined rotary and translatory movement guided by said slots (23, 24).
2. Dishwashing machine according to claim 1, characterized in that, for displacing the rack (10) from the lower position into the upper position thereof, the slots (23, 24) are adapted to guide the same rack into a combined movement thereof comprising the successive phases of:
 - rotation about the rear pins (14), so as to enable the front pins (13) to climb over the vertex of the first slots (23);
 - forward translation of the pins along their respective slots so as to enable the rear pins (14) to climb over the vertex of the second slots (24);
 - backward translation of the pins along their respective slots so as to enable the pins (13, 14) to get into position at their respective seats (25, 24s) provided in the upper legs of the slots (23, 24).
3. Dishwashing machine according to claim 1, characterized in that for displacing the rack (10) from the upper position into the lower position thereof, the

slots (23, 24) are adapted to guide the same rack into a combined movement thereof comprising the successive phases of:

- forward translation of the pins along their respective slots so as to enable the rear pins (14) to climb over the vertex of the second slots (24); 5
 - backward translation of the pins along their respective slots so as to enable the front pins (13) to climb over the vertex of the first slots (23); 10
 - rotation about the rear pins (14) so as to enable the pins (13, 14) to get into position at said seats (23i, 24i) provided in the lower legs of the slots (23, 24). 15
4. Dishwashing machine according to claim 1, characterized in that said pins (13, 14) are firmly joined to or integral with the rack (10), while said slots (23, 24) are provided, in correspondence of each one of said opposite sides, on a support body (15) adapted to be mounted in a longitudinally slidable manner on guiding means (20) provided in the washing vessel of the machine. 20 25
5. Dishwashing machine according to claim 1, characterized in that said first slots (23) extend to a greater height than the second slots (24) and the seats (25) of the upper legs thereof are provided in a position which is substantially adjacent to the vertex thereof. 30

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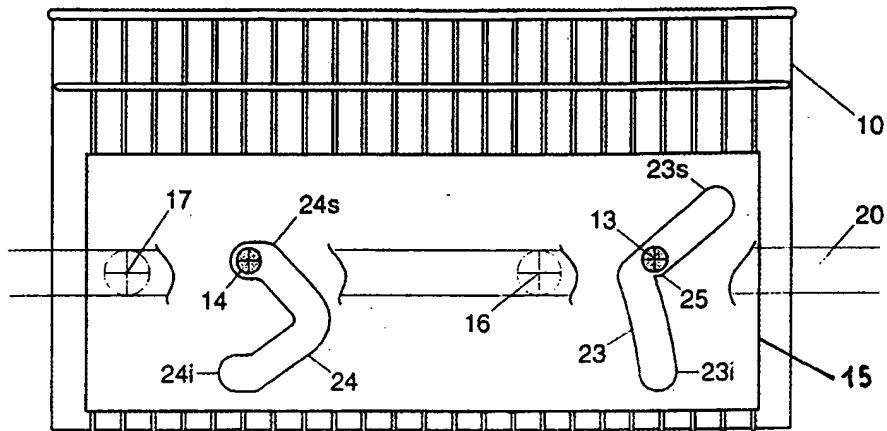


FIG. 1

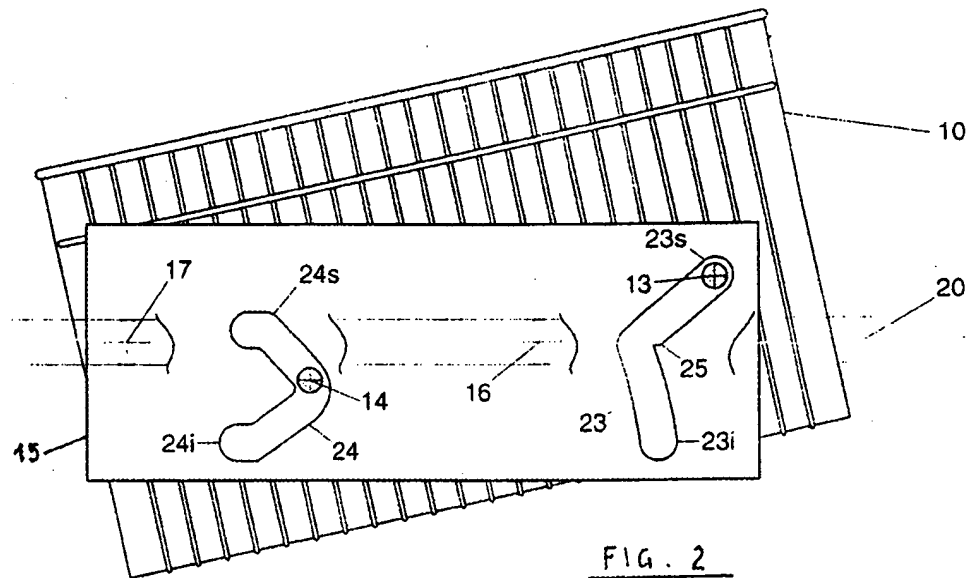


FIG. 2

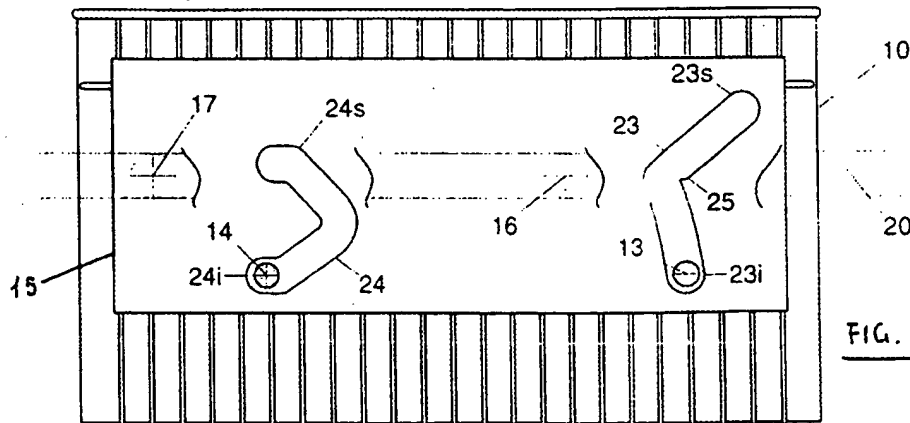


FIG. 3

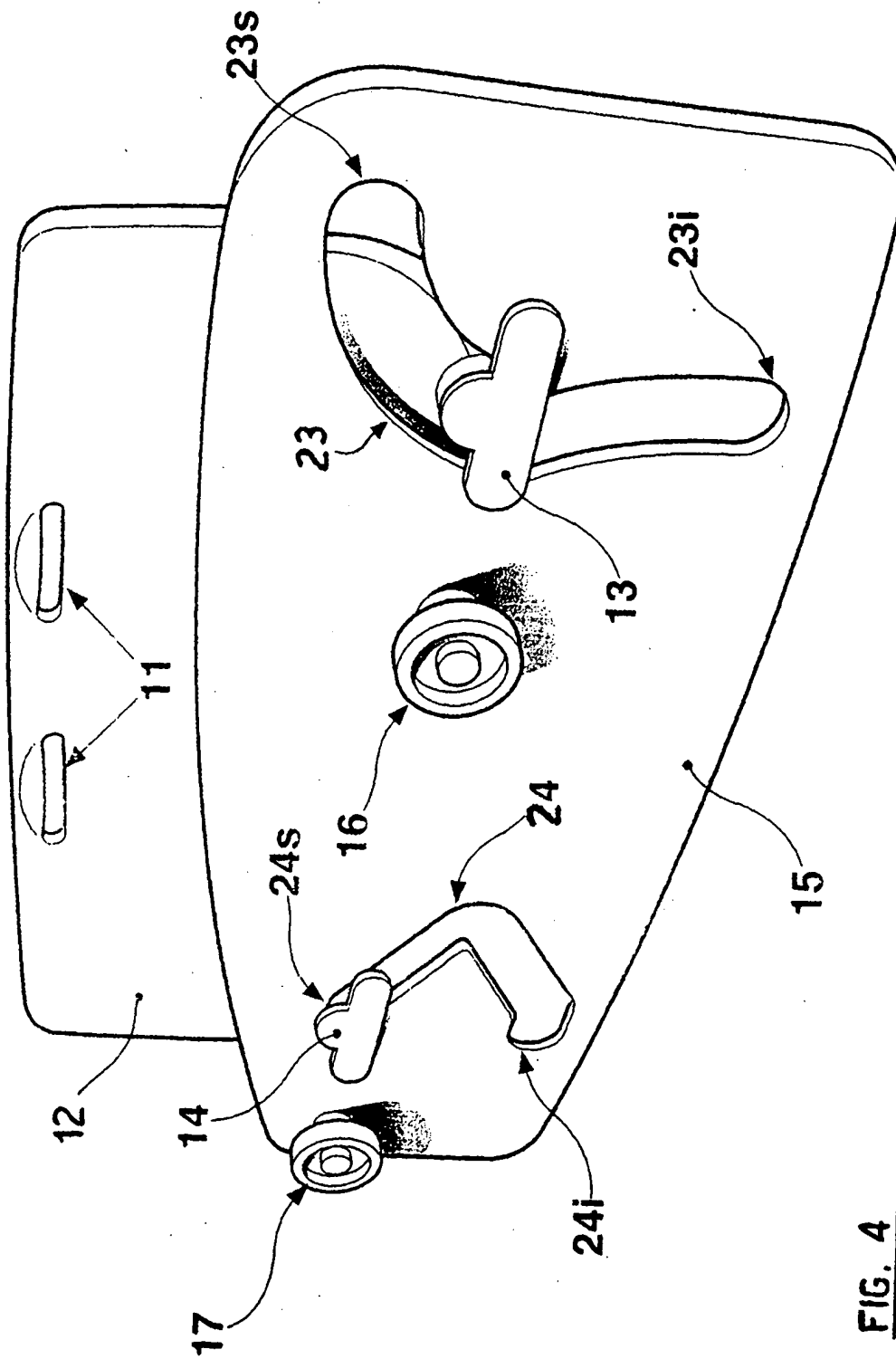


FIG. 4